CURRENT LITERATURE
IN
AGRICULTURAL ENGINEERING

BUREAU OF AGRICULTURAL CHEMISTRY AND ENGINEERING
UNITED STATES DEPARTMENT OF AGRICULTURE

Vol. 9, No. 11. WASHINGTON, D.C. June, 1940.

Accidents.

Farm accidents take a heavy toll. By D. J. Price and H. E. Roethe. Washington, U.S. Bureau of agricultural chemistry and engineering, 1940. 4p. mimeographed.

Agricultural Engineering.

Basic engineering factors in agricultural technology. By L. M. K. Boelter. Mechanical engineering. v.62,no.3. March, 1940. p.226-230. "Bibliography": p.230. "Problems of developing industrial uses for agricultural products have not been mentioned. Author has attempted to indicate that tasks of agricultural engineer (restricted to production, raw processing and transportation) require incidence of knowledge from all of fields of engineering as well as from "life sciences."

Agriculture.

Agricultural Adjustment, 1938-39; report of the activities carried on by the Agricultural Adjustment Administration. Washington, U.S. Govt.print.off., 1939. 142p.

Agricultural relief measures relating to the raising of farm prices - 74th Congress, January 3, 1935 to June 20, 1936. Compiled by M. E. Wheeler. Washington, D.C., 1940. 75p. mimeographed. U.S. Bureau of agricultural economics. Agricultural economics bibliography no.84.

The United States Department of Agriculture; its structure and functions. By A. P. Chew. Washington, U.S. Govt.print.off., 1940. 242p. U.S. Department of agriculture. Miscellaneous publication no.88.

Air Conditioning.

Summer cooling in the research residence with a condensing unit operated at two capacities; report of an investigation conducted by the Engineering experiment station, University of Illinois, in cooperation with the American society of heating and ventilating engineers and the National warm-air heating and air-conditioning association. By A. P. Kratz and others. Urbana, Illinois, 1940. 72p. University of Illinois. Engineering experiment station. Bulletin series no.321.

Belts.

Better belt transmission. By Fred Engler. Southern power and industry. v.58,no.1. January, 1940. p.40-41.

Modern belt transmission. Rayon textile monthly. v.21,no.3. March, 1940. p.173-176. Flat and V-Section.

Brooders, Electric.

Converting oil burning brooders and incubators to electric. By W. C. Krueger. Electricity on the farm. v.13,no.4. April, 1940. p.16.

Electric brooding is here to stay. By Roy E. Jones. Electricity on the farm. v.13,no.2. February, 1940. p.6-8. Advantages of electric brooding: better feathering, rapid growth, high humidity, never overheated, ideal for hot-weather brooding, reduces labor. Disadvantages of electric brooding: power failure, excessive moisture, insufficient heat.

Building Construction.

Budgeted modernizing. By R. P. Scaggs. Capper's farmer. v.50,no.12. December, 1939. p.11.

Construction joints. By Byram W. Steele. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.908-943. Construction joint as treated in this paper is a formed or unformed, horizontal, vertical or inclined surface between masses of concrete placed at different times. Spacing, form, and method of construction of such joints are leading topics considered.

A good lumber house--how to specify and build it. American builder. v.62,no.1. January, 1940. p.58-63.

Hollow wall tile equals two bricks in size. Popular mechanics magazine. v.73,no.5. May, 1940. p.673. Lightness in weight is combined with strong construction in tile brick which has two inner air cells. Its dimensions are twelve, by three and one-half, by three and three-quarters inches, being proportioned about same as ordinary brick but having twice face area. Cellular design provides air insulation and accounts for reduction to almost half weight of brick. There are fewer mortar joints to fill and it is claimed that one tile is handled as easily as brick, yet it is twice its size. It is produced in wide variety of colors to take place of face brick, but is supplied also in "basic" color.

How to estimate accurately. By J. Douglas Wilson. American builder. v.61,no.11. November, 1939. p.71-72,96,98,100. Presents interior finish.

Building Construction. (Cont'd).

New effects with wood siding. American builder. v.62,no.1. January, 1940. p.64-70.

Repeated stresses on structures. By F. C. Lea. Structural engineer. v.18,no.2. February, 1940. p.511-520. Part II. Repeated stresses on reinforced concrete.

Timber connectors for stronger joints. American builder. v.62,no.1. January, 1940. p.55.

Building Materials.

Cotton's uses in relation to housing and construction. By Charles K. Everett. Manufacturers record. v.108,no.12. December, 1939. p.19,46,58.

Lumber grade-use guide. American builder. v.62,no.1. January, 1940. p.72-75.

New tendencies in rural building. By H. J. Hopfen. Monthly bulletin of agricultural science and practice. Year 31,no.1. January, 1940. p.24T-28T. Recent trials of methods of construction. Building with bricks. Stone buildings. Concrete building. Clay construction (Adobe). Building with wood and fibrous materials.

Stability of fiber building boards as determined by accelerated aging. By D. A. Jessup, C. G. Weber and S. G. Weissberg. Washington, U.S. Govt.print.off., 1940. 6p. U.S. National bureau of standards. Building materials and structures. Report BMS50.

Superpressed plywood. By R. K. Bernhard, T. D. Perry and E. G. Stern. Mechanical engineering. v.62,no.3. March, 1940. p.189-195. "Bibliography:" p.195. Paper describes and summarizes series of tests to determine principles involved in fabricating such superpressed plywood in practical and economical manner. While much remains to be done in much further testing, this superpressed plywood opens new possibilities for the plywood industry.

Surface treatment of steel prior to painting. By R. E. Pollard and W. C. Porter. Washington, U.S. Govt.print.off., 1940. 17p. U.S. National bureau of standards. Building materials and structures. Report BMS44.

Canals.

Supply canal for Lower Rio Grande. Engineering news-record. v.124,no.19. May 9, 1940. p.662-663. Conference of engineers convened by American Boundary Commissioner proposes

Canals. (Cont'd).

$60,000,000 canal amd reservoir project to carry 3,000 cfs from a diversion at Rincon 168 miles to Brownsville to remedy threatened water shortages.

Chemistry, Technical.

Chemurgy the hope of Texas. By Victor Schoffelmayer. Texas opportunities. March, 1940. p.6-8.

Engineering in the service of chemistry. By Thomas H. Chilton. Industrial and engineering chemistry. Industrial edition. v.32,no.1. January, 1940. p.23-31.

New chemical wealth from the farm. By Christy Borth. Science digest. v.7,no.1. January, 1940. p.27-32. Cotton plants to produce all seeds and no fiber. Peanuts to yield eight hundred pounds of oil per acre. Soy beans to triple in acreage. These are some present aims of agricultural scientists. The United States needs two billion more pounds of fats and oils to meet changed eating and manufacturing habits. (Condensed from the book Pioneers of Plenty.)

Colorado River.

Development of the Colorado River in the Upper Basin: discussion. By C. C. Elder. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.956-960.

Concrete.

Concrete control. By I. L. Tyler. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.891-907. Paper is attempt to describe, very briefly, present state of progress in concrete manufacture and control as applied to construction of dams, with some mention of factors that may be of importance to future developments. As scope of this paper will permit only small amount of detailed discussion, list of references is included in Appendix for benefit of those who may wish to study some subjects mentioned.

Corrosion.

Corrosion in steam heating systems. By Leo F. Collins and Everette L. Henderson. Heating, piping and air conditioning. v.12,no.3. March, 1940. p.159-162. Removal of gases from feedwater. Data on removal of oxygen and carbon dioxide from feedwater have been obtained from about seven pieces of plant equipment but only those representative of four installations are recorded. These are believed to typify performance of equipment in each class. In these four instances brief description of unit and its operation are given, so its limitations as well as its accomplishments may be known.

Cotton.

Cotton variety tests in Oklahoma; 1939 report. Conducted by H. E. Dunlavy, I. M. Parrott and F. W. Self. Stillwater, Okla., 1940. 56p. processed. Oklahoma agricultural and mechanical college. Agricultural experiment station. Circular no.87.

Crops. (Drying).

Electricity aids sweetpotato growers. By R. R. Denison. Rural electrification news. v.5,no.7. March, 1940. p.8-9. Advantages of controlled electric heat in potato curing as follows: 1. There is no chilling of potatoes in bottom hampers because heat is applied beneath potatoes. 2. Uniform distribution of heat throughout building limits temperature variations to about 2° F. 3. Automatic control eliminates danger of overheating or chilling. 4. Fire hazard is practically eliminated. 5. Labor costs are reduced because only attention necessary is to set thermostat for desired temperature and adjust ventilators. 6. Increase of approximately 7 percent in marketable potatoes is nearly sufficient to offset cost of complete electrical equipment in single season.

Electricity dries hay in barn. By C. Elmer Wylie. Jersey bulletin. v.59,no.12. March 20, 1940. p.438-439. Complete report of this experiment is given in new bulletin on subject of Drying Hay in the Barn and Testing Its Feeding Value. This is Bulletin 170, Tennessee Agricultural Experiment Station, Knoxville, Tennessee.

Safe temperatures for drying seed corn. Grain and feed journals. v.84,no.1. January 10, 1940. p.35. During fall of 1936 seed corn was dried under twenty-six different sets of carefully controlled conditions in constant condition laboratory drier at Illinois Agricultural Experiment station. Corn varying in original moisture content from 24 to 39 per cent was dried at temperatures of 110° to 170° F., and at relative humidities of 8 to 68 per cent. One hundred sixty kernels from each run of 16 ears were germinated as indication of effect the drying conditions had on viability. In addition, 160 hills from each run were planted to determine effect drying condition had on yield.

Findings substantiate generally accepted fact that temperature of 110° F. will not injure seed corn. However, equally good germination was secured with corn of any original moisture content dried at temperature of 120° F. and at humidities up to 58 per cent.

An unusual crop for drying. By R. N. Dixey. Farm economist. v.3,no.3. July, 1939. p.42. Gives cost figures.

Dairy Products.

Production and consumption of manufactured dairy products. By E. E. Vial. Washington, U.S. Govt.print.off., 1940. 76p. U.S. Department of agriculture. Technical bulletin no.722.

Dams.

Basic design assumptions. By Ivan E. Houk and Kenneth B. Keener. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.813-828. Basic assumptions and related technical considerations involved in design of high and important masonry dams of the single-arch, curved gravity, and straight gravity types, built on rock foundations, are presented. Paper does not attempt to cover, comprehensively, fundamental criteria involved in design of multiple-arch dams, reinforced-concrete slab and buttress dams, roundhead buttress dams, or other special types of masonry dams. Paper is confined, primarily, to basic assumptions which have either undergone appreciable modifications during recent years or have been developed as entirely new criteria for design of important masonry dams of aforementioned types. Basic information, such as normal streamflow conditions at site, magnitudes of ice pressure, maximum range of seasonal concrete temperature changes, physical properties of concrete materials, and other data which may be intelligently ascertained or predicted from readily available records, or may be determined by routine laboratory measurements, are not discussed. Assumptions involved in determining maximum anticipated flood intensities for use in designing spillway features constitute special problem and consequently are not included. Basic assumptions for design of masonry dams are treated from viewpoints of dam site, dam, load conditions, structural action, stability factors, and stress conditions. Details of procedures involved in dam design are not included. Bibliography at end of paper lists the more important recent articles which should be consulted by any one interested in exhaustive consideration of subject.

Design of arch dams. By R. S. Lieurance. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.829-851. Presents comprehensive series of tables to facilitate computation of forces, moments, and radial deflections in design of arch dams. Seven basic load conditions are thus provided for, in Appendix, and text comprises brief discussion of design problems involved.

Geological problems of dams. By Irving B. Crosby. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.869-890. Paper is confined to consideration of geological and foundation problems of masonry dams founded upon rock. Foundation problems vary for different types of foundation rock and for different types of geologic structure. These

Dams. (Cont'd).

problems are illustrated by examples of successful dams and dam failures on different types of rock and geologic structure. Purpose of these descriptions of dam failures is to point out various geologic conditions which may cause failure and not to renew discussion of conditions pertaining to each individual failure. Thesis of this paper is that essential foundation conditions can be determined in advance, that at most sites safe dams can be built, and that dam failures are not unavoidable.

Masonry dams: a symposium. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.811-943.

Preparation of foundations. By Charles H. Paul and Joseph Jacobs. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.852-868. It is assumed that only rock foundations are considered in this paper, except as indicated in section headed "Special Conditions." Term "foundation" is taken to mean not only entire area on which dam rests, but also areas upstream and downstream and out into abutments adjacent to limits of superimposed structure, as far as loading, seepage, or scour criteria may require.

Diesel Engines.

Diesel's two-way power stroke reduces its vibration. Popular mechanics magazine. v.73,no.5. May, 1940. p.679. Exerting both upward and downward power stroke simultaneously, Diesel engine developed by mechanical engineer is claimed to reduce vibration more than seventy-five per cent by relieving crankshaft of much of pounding experienced with most Diesels. Piston operates within moving sleeve, both being connected to crankshaft with connecting rods. When explosion takes place between two, it drives sleeve upward and piston downward, thus producing dual power impulse, one on upstroke and other on downstroke. Using new construction, two lightweight engines have been designed, both of which have spark plugs for starting because of their lower compression. One of these Diesels weighs fifty pounds and develops five horsepower. Other, weighing about thirty-five pounds, develops two and one-half horsepower and is said to be the world's smallest Diesel.

Drainage.

Drainage of sugar cane lands. By H. A. Nadler and Rafael Delgado Márquez. Facts about sugar. v.35,no.2. February, 1940. p.56-57.

Electric Wiring.

Farm wiring handbook; guide for planning electrical wiring on farms. Bridgeport, Conn., General Electric Co., 1940. 28p.

Electricity - Distribution.

Electric light and power industry in 1939. Edison electric institute bulletin. v.8,no.1. January, 1940. p.1-4.

Rural electrification surveys of Harvey and Dickinson counties. By F. C. Fenton and D. E. Wiant. Manhattan, Kansas, 1940. 48p. Kansas state college. Engineering experiment station. Bulletin no.39.

Farm Machinery and Equipment.

Beet harvester ready for production. By F. Hal Higgins. Farm implement news. v.61,no.6. March 21, 1940. p.35.

Electric garden cultivator. Electricity on the farm. v.13,no.4. April, 1940. p.13.

Falkiner cane harvester. Australian sugar journal. v.31,no.12. March 7, 1940. p.677-679. History of the Falkiner harvester is traced.

Farm equipment census. Farm machinery and equipment. April, 1940. p.12. Manufacture and sale of farm equipment and related products compared with years 1937 and 1938.

Farm equipment census. Better farm equipment and methods. v.12,no.9-10. May-June, 1940. p.12-13. Manufacture and sale of farm equipment and related products compared with years 1937 and 1938.

Farmers new appreciation of spreaders spurs trade. Implement and tractor. v.55,no.7. April 27, 1940. p.12-13,20.

I.H.C.'s new modernly styled 4-foot combine. Implement and tractor. v.55,no.6. March 16, 1940. p.23,32.

Mechanical sugar beet topper shows good results. New agriculture. v.22,no.7. April, 1940. p.11. Mechanical sugar beet topper developed by Univ. of Calif. College of Agriculture has been tested in four western states, including Calif., during past year and has given results comparable to those obtained when topping is done by hand. Known as variable cut topper, machine is based on information showing definite correlation between thickness of beet crown and height that beet grows above ground. Topping is done by vibrating knife connected with self-centering finder. As finder passes over beet in field it guages height of cut so that knife takes larger cut on high beet than on low one. Finder and knife are equipped with springs that hasten depression of knife when passing from high to low beet. If gravity alone were depended upon to lower knife, machine traveling at its regular speed of three miles per hour in field would cause many beets to be missed.

Farm Machinery and Equipment. (Cont'd).

Mechanization of Wisconsin agriculture. By F. W. Duffee. Farm implement news. v.61,no.6. March 21, 1940. p.28-29.

Mechanized dusting for pea weevil. By Hobart Beresford. Implement record. v.37,no.4. April, 1940. p.11,56.

Moreau sugar beet harvester. Implement and machinery review. v.65,no.780. April 1, 1940. p.1148-1150.

1939 production and sales of farm equipment as shown by report of the U. S. Census Bureau. Farm implement news. v.61,no.8. April 18, 1940. p.34-38.

Oliver announces Golden Grain Master. Implement and tractor. v.55,no.7. April 27, 1940. p.15,22. Unit designed to handle any crop that can be combined and to accomplish it without lot of extra attachments or delicate adjustments. It can be pulled and operated by any good tractor of two-plow capacity.

Suggestions for windrow harvesting. By George Innes. Implement and tractor. v.55,no.2. January 20, 1940. p.25,30.

Tractor, thresher and combine production and sales in 1939. Farm implement news. v.61,no.3. February 8, 1940. p.16,17.

Farm Mechanics.

Sharpening farm tools. Electricity on the farm. v.13,no.2. February, 1940. p.13-14. Instructions in outline form for use of electric grinders and sharpening of edge tools commonly used on farm.

Farmhouses.

Homemade homes in Arkansas. By Esther G. Kramer. Farm and ranch. v.58,no.12. December, 1939. p.5,32.

Fences.

Barbed wire fencing--a prairie invention: its rise and influence in the Western States. By Earl W. Hayter. Agricultural history. v.13,no.4. October, 1939. p.189-207.

Fibers, Synthetic.

Air, water, coal--hosiery. By H. T. Rutledge. Scientific American. v.162,no.2. February, 1940. p.78-81. Fiber from abundant raw materials. Fiber is only one of a large family of chemical products known as Nylon. Research that led to them.

Fire Protection.

Chopped hay lessens danger of barn fires. By Cecil Barger. Missouri ruralist. v.81,no.5. March 2, 1940. p.18.

Floods and Flood Control.

Flood-control methods; their physical and economic limitations. Progress report of committee of the Hydraulics division on flood control: discussion. By Lynn Crandall. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.990.

Flood-protection data: progress report of the Committee. American society of civil engineers. Proceedings. v.66,no.4, Part 1. April, 1940. p.615-626. 1. Hydro-meteorological studies. 2. Floods in close succession. 3. Statistical methods. 4. Inventory of flood data. 5. Recent publications. 6. Cooperation between agencies. 7. Floods caused by ice.

Floods of December 1937 in northern California. By H. D. McGlashan and R. C. Briggs. Washington, U.S. Govt.print.off., 1939. 497p. processed. U.S. Geological survey. Water-supply paper no.843.

Transient flood peaks: discussion. By James M. Fox, F. C. Finkle, A. L. Sonderegger, Harold C. Troxell and R. Stanley Lord. American society of civil engineers. Proceedings. v.66,no.4, Part 1. April, 1940. p.745-769.

Transient flood peaks: discussion. By Karl J. Bermel and R. W. Davenport. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.995-1002.

Floors.

Elevated floors for calves. By C. C. Bahrenburg, Jr. Hoard's dairyman. v.85,no.3. February 10, 1940. p.78,97.

Portable apparatus for determining the relative wear resistance of concrete floors. By Louis Schuman and John Tucker, Jr. Journal of research of the National Bureau of Standards. v.23,no.5. November, 1939. p.549-570. Portable machine for producing rapid wear and optical gage for measuring depths of wear were designed and built. Studies were made on 138 slabs of concrete to determine effect of various mixes and C/W ratios and of such factors as aggregate types and grading, finishing procedures, dust coats, and liquid surface treatments. Tests show that metallic hardeners, dust coats containing cement, and delayed troweling are effective in increasing wear resistance. Test methods used show advantages in use of dry mixes, coarse aggregates, and of adequate damp curing. Use of high-early-strength cement permitted damp curing period to be greatly reduced without decreasing wear resistance.

Flow of Water and Gases.

Effects of rifling on four-inch pipe transporting solids: discussion. By David L. Neuman. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.770-772.

Effects of rifling on four-inch pipe transporting solids: discussion. By R. Y. Newell, Jr. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.991-994.

Historical sketch of flow of fluids through pipes and suggested solutions of pipe flow problems. By C. E. S. Bardsley. Stillwater, Okla., 1940. Oklahoma agricultural and mechanical college. Engineering experiment station. Publication no.44.

Stream flow in Ohio for 1939. By Tate Dalrymple. Engineering experiment station news. Ohio State University. v.12,no.2. April, 1940. p.28-30.

Water. Flow, friction, measurement and power. Water works and sewerage. v.87,no.4. April, 1940. p.16-25. Part 1. Reference and data section.

Fuels.

Anthracite as a fuel for domestic heating. By A. J. Johnson. Mechanical engineering. v.62,no.3. March, 1940. p.208-210. "Bibliography": p.210.

Distillate fuel for tractors holds own with gasoline. National petroleum news. v.32,no.14. April 3, 1940. p.R-110,R-112.

Wood waste for fuel. By J. E. Hyler. Southern power and industry. v.58,no.1. January, 1940. p.57-59. Part I--Preparation of hog fuel.

Heating.

Domestic-heating boilers for automatic firing. By L. N. Hunter. Mechanical engineering. v.62,no.3. March, 1940. p.203-206. Bibliography: p.206.

Domestic heating with coke. By C. G. Russell. Mechanical engineering. v.62,no.3. March, 1940. p.211-212.

Domestic oil burners. By M. A. Powers. Mechanical engineering. v.62,no.3. March, 1940. p.207-208.

Gas heating. By C. G. Segeler. Mechanical engineering. v.62,no.3. March, 1940. p.212-214.

Hotbeds and Cold Frames.

Hotbeds and cold frames. By T. F. Ritchie. Ottawa, Canada, 1940. 4p. Dominion of Canada. Department of agriculture. Circular 166.

How to install your electric hotbed. By J. W. Weaver, Jr. and E. T. Swink. Rural electrification news. v.5,no.6. February, 1940. p.19-22.

Hydraulics.

Artesian-well hydraulics by unit-head-loss method. By M. A. Churchill. Civil engineering. v.10,no.5. May, 1940. p.307-309.

Relation of the statistical theory of turbulence to hydraulics: discussion. By Clyde W. Hubbard, John S. McNown and Samuel Shulits. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.709-716.

Relation of the statistical theory of turbulence to hydraulics: discussion. By Paul Nemenyi and Bennie N. Notzer. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.967-979.

Insulation.

Diminishing effectiveness of successive thicknesses of insulating materials. By Paul D. Close. Heating, piping and air conditioning. v.12,no.3. March, 1940. p.191-194.
Paper is intended solely to illustrate diminishing effectiveness of successive thicknesses of insulating materials irrespective of economic considerations which would necessarily involve heating and insulation costs, depreciation, and other variables entering into such problems.

Insulation for cold storage. By Ralph Winslow. Southern power and industry. v.58,no.5. May, 1940. p.40-43.
Good materials, properly applied and protected from abuse, insure against failure and keep maintenance low.

Permissible composition and concentration of irrigation water. By W. P. Kelley. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.607-613.
Limit of permissible salt content of irrigation water is greatly influenced by variables inherent in soil, climatic conditions, and kind of crops grown. It is of greatest importance to apply saline irrigation water in quantities in excess of crop requirements, in order that some leaching of root zone will take place. Therefore, maintenance of good drainage condition in soil is very important. Salts, whether native to soil or applied in irrigation water, cannot be removed effectively unless water can percolate through soil, and this can never be accomplished adequately where ground water is near surface.

Irrigation.

Irrigation in Puerto Rican cane fields. By R. A. Gonzalez. Facts about sugar. v.35,no.2. February, 1940. p.52-55.

Irrigation now standard equipment for vegetable farms. Market growers journal. v.66,no.9. May 1, 1940. p.234.

New method for controlling the irrigation of soils. By G. J. Bouyoucos and A. H. Mick. New agriculture. v.22,no.7. April, 1940. p.8. New method of measuring soil moisture which may possess great value in controlling irrigation has been developed by Soils Dept. of Mich. State College. Apparatus gives continuous measurement of soil moisture in sites under field conditions without disturbing either plant or soil. Continuous measure of soil moisture at various depths reveals actual moisture condition at any time, thus enabling practice of more efficient and economical irrigation. Apparatus consists of absorption block about size of small match box which box which is buried at any desired depth in soil. Two insulated wire leads connect this block to specially devised portable instrument which measures electrical resistance of block. Since blocks are porous they readily take up moisture from soil. As soil dries out block loses moisture so that changes in soil moisture are followed by changes in block moisture. Furthermore electrical resistance of block changes in proportion to its moisture content. Hence change in soil moisture is measured by change in electrical resistance of absorption block. Many absorption blocks can be distributed over growing areas at different depths to provide numerous points of measurement.

Laboratories.

Regional laboratory and the State stations. By V. R. Gardner. Poultry science. v.19,no.2. March, 1940. p.109-110.

Regional research poultry laboratory. By J. R. Mohler. Poultry science. v.19,no.2. March, 1940. p.106-108.

Land Utilization.

Land classification; a selected bibliography. Compiled by O. E. Goodsell. Washington, D.C., 1940. 95p. mimeographed. U.S. Bureau of agricultural economics. Agricultural economics bibliography no.83.

Lighting.

Light plant for farm or camp has automatic starter. Popular mechanics magazine. v.73,no.5. May, 1940. p.726. Starting automatically whenever light switch in house is turned on, compact lighting plant for isolated farm or camp provides

Lighting. (Cont'd).

convenient power source. It is unnecessary to throw any master switch. When room lamp is turned on, it operates relay for gasoline engine starter which is turned by a six-volt automobile battery, setting generator in operation. Plant shuts down immediately when last light is turned off. Available for alternating-current circuits of one Kilowatt or more, it operates at cost of three and one-half cents kilowatt-hour.

Progress report of studies on artificial lighting of dairy stables. By M. A. R. Kelley and A. V. Krewatch. Washington, U.S. Bureau of agricultural chemistry and engineering, 1940. 13p. mimeographed.

Lubrication.

Lubricating the farm tractor. By J. Howard Pile. Better farm equipment and methods. v.12,no.9-10. May-June, 1940. p.8-9,25. Program planned to help lubricate farm equipment most efficiently.

Miscellaneous.

Postgraduate training of young mechanical engineers. By A. G. Christie. Mechanical engineering. v.62,no.1. January, 1940. p.5-8.

Public relations of science. By Wesley C. Mitchell. Science. v.90,no.2348. December 29, 1939. p.599-607.

Statistical abstract of the United States, 1939. Bureau of the Census, U.S. Department of Commerce. Washington, U.S. Govt. print.off., 1940. 916p.

Motor Fuel.

Engine fuel testing and proposals for its further development. By Alexander v. Philippovich. National petroleum news. v.31,no.50. December 13, 1939. p.R-526,R-528,R-530,R-532. Basic disadvantage of A.S.T.M. octane number is that it is adapted to mean value of road knock values. To this may be added disadvantages of its method of determination, particularly employment of bouncing pin and measurement at single fuel-air ratio. To avoid disadvantages and retain advantage of international acceptance, it is proposed to retain Motor method but add further tests. These include determination of octane numbers at 86°, 122°, and 212°, F. mixture temperatures, recording compression ratio prevailing at point of incipient detonation, introducing improved instrument for knock indication, selecting fuels for given engine to use octane number or incipient knock points obtained at temperature corresponding with temperature characteristic of engine, and investigation of octane number in

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range of rich mixture ratios. Classification of fuels by means of diagram covering materials of known composition is suggested, leading back to one-point measurement, provided diagram for material involved is known. To judge fuel's overall behavior it is required only that measured point lie on required line in diagram.

Motors, Electric.

Electric motors. By H. P. Richter. Electricity on the farm. v.12,no.12. December, 1939. p.13,20. Rating, capacity, power used, speeds, temperature rise under load, protective devices of motors; types of motors, their application and care.

Electric motors. By H. P. Richter. Electricity on the farm. v.13,no.2. February, 1940. p.11,25. Article No.3--types of motors.

Patents.

Patents make jobs. By Robert L. Lund. Farm machinery and equipment. April, 1940. p.7-8,34. How research and invention have built the greatest scientific and industrial civilization, with the highest standard of living the world has ever known.

Rules of practice in the United States Patent Office. Revised February 1, 1940. Patent Office, Department of Commerce. Washington, U.S. Govt.print.off., 1940. 105p.

Production Costs.

Costs in dairy farming. By L. C. Cunningham. Ithaca, N.Y., 1940. 36p. New York State college of agriculture. Cornell extension bulletin 427.

Notes on baling costs on a Midland farm, 1937-8. By A. Bridges. Farm economist. v.3,no.3. July, 1939. p.39-41.

Pumps and Pumping.

Pumping water for irrigation of pastures and fodder crops. By T. P. Taylor. Agricultural gazette of New South Wales. v.51,pt.2. February 1, 1940. p.72-76,112.

Rainfall and Runoff.

Studies of rainfall intensity. By Erwin R. Breihan and H. G. Armistead, Jr. Civil engineering. v.10,no.5. May, 1940. p.303-306. Relation of hourly mean rainfall to actual intensities. By E. R. Breihan. Rainfall intensity study for 1938-1939, for Edwardsville, Ill. By H. G. Armistead, Jr.

Refrigerator Lockers.

Fruits and vegetables for refrigerated locker plants. By H. H. Plagge. Locker patron. v.1,no.7. February, 1940. p.10-11. Describes the ordinary equipment for preparation of fruits and vegetables for freezing, and simple directions for its use.

Research.

Progress through research. By Charles F. Roth. Chemical and metallurgical engineering. v.46,no.11. November, 1939. p.686-688. Study of the continuing and varied research programs of many equipment makers shows numerous advances that benefit the Chemical Process Industries.

Regional government research on cotton linters, chemical cotton, cellulose, woodpulp, etc. By H. R. Mauersberger. Rayon textile monthly. v.21,no.3. March, 1940. p.134-135.

Regional Government research, on cotton linters, chemical cotton, cellulose, woodpulp, etc. By H. R. Mauersberger. Rayon textile monthly. v.21,no.4. April, 1940. p.82-83.

Research and invention in engineering colleges. By A. A. Potter. Mechanical engineering. v.62,no.3. March, 1940. p.196-200. Practice of engineering can only be kept up to date through research. Engineering research has among its major objectives development by scientific means of new manufactured products, more efficient machines and tools, special mechanisms and devices, improved meters and instruments, better manufacturing processes, and more economical methods of operating equipment. Industries which have made most spectacular progress are also foremost in research. Research is integral part of any organization interested in efficiency, in long-range goals, and in linking present with future.

Timber research. Indian engineering. v.107,no.2. February, 1940. p.49-50. Progress at Forest Products Research Laboratory.

Reservoirs.

Functional design of flood control reservoirs: discussion. By Sherman M. Woodward, M. Kindinger, P. Wilhelm Werner, and Waldo E. Smith. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.695-706.

Functional design of flood control reservoirs: discussion. By J. O. Jones and W. C. Hammatt. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.961-963.

Sewage Disposal.

Rural sewage disposal made safe. By C. A. Crowley. Popular mechanics magazine. v.73,no.5. May, 1940. p.788-791.

Soil Corrosion.

Soil-corrosion studies, 1937. Corrosion-resistant materials and special tests. By Kirk H. Logan. Journal of research of the National Bureau of Standards. v.23,no.4. October, 1939. p.515-542. Soil-corrosion investigation begun in 1922 showed that many soils cause rapid corrosion of commonly used pipe materials. Manufacturers of pipe have tried to develop materials more resistant to corrosion. In 1932 some of these materials were buried in 15 corrosive soils for purpose of determining their resistance to soil corrosion. Specimens are being removed at intervals of 2 or more years. Second group of specimens, including 41 metals and alloys and 11 protective coatings, was removed in 1937, and results of their examination are contained in this paper. Results of several special tests are also given. Several of materials resisted very well most of soils to which they were exposed, but none of them was unattacked by all of soils. Results indicate that pipe materials should be chosen with respect to soils to which they are to be exposed.

Soil Moisture.

Evaporation of moisture from soil in large lysimeter pots. By P. L. Gow. Hawaiian planters' record. v.43,no.4. Fourth quarter, 1939. p.287-291.

Tests disclose how much water soils will hold. New agriculture. v.22,no.7. April, 1940. p.8. Tests by 10 investigators in 8 states on 20 different classes of soil show that amount of water absorbed by soil when in need of irrigation varies from one-half inch of water per foot of sandy soil to 2 and one-fourth inches per foot in clay loam soil. All observations of moisture content of soils for most crops on most soils show that about one-half inch of water in each foot of soil must be available to keep crops from wilting. If soil cannot hold more than 1 and one-half inches of available water in each foot, then clearly it is desirable to add only 1 inch of water to each foot of soil that needs water. Storage of water in soil during time there is surplus can be called efficient use of water, provided attempt is not made to store more water than soil will hold.

Solar Radiation.

To heat and air condition house with solar energy. Science news letter. v.36,no.21. November 18, 1939. p.332-333. Experimental house built by MIT will try several types of heat traps and store energy in basement.

Storage of Farm Produce.

Farm refrigerated storages. By E. L. Arnold. Ithaca, N.Y., 1939. 40p. Cornell University agricultural experiment station. Bulletin 724.

Swine Houses and Equipment.

The pig's big brooder. By Howard Engelbrecht. Iowa agriculturist. v.40,no.8. March, 1940. p.2,10. Electric pig brooder introduces a simple and inexpensive device which promises to greatly reduce losses of small pigs.

Textile Fibers.

Engineering aspects of textile technology. By Edward R. Schwarz. Mechanical engineering. v.62,no.5. May, 1940. p.361-364. Research in the field of fiber structure. Similarity of structural and textile studies. X-ray examination of fiber structure. Stresses imposed by manufacturing processes. Heat resisting and insulating qualities of fabrics. Permeability testing of fabrics. Importance of quality of resilience in textiles. Effect of alternate stresses on fibers. Combination of molecular elements in synthetic fibers.

Progress in the historical development and patents of rayon staple fibers. By Edward C. Worden. Rayon textile monthly. v.21,no.1. January, 1940. p.61-62.

Progress in the historical development and patents of rayon staple fibers. By Edward C. Worden. Rayon textile monthly. v.21,no.2. February, 1940. p.51-52.

Progress in the historical development and patents of rayon staple fibers. By Edward C. Worden. Rayon textile monthly. v.21,no.3. March, 1940. p.143-145.

Textile fiber atlas. By Werner von Bergen and Walter Krauss. Rayon textile monthly. v.21,no.1. January, 1940. p.57-60. Part I. Wool.

Textile fiber atlas. By Werner von Bergen and Walter Krauss. Rayon textile monthly. v.21,no.2. February, 1940. p.47-50. Part II. Specialty hair fibers.

Textile fiber atlas. By Werner von Bergen and Walter Krauss. Rayon textile monthly. v.21,no.3. March, 1940. p.149-153. Part III--Fur fibers.

"Vinyon"--the new textile fiber and yarn. Rayon textile monthly. v.21,no.2. February, 1940. p.34-35. Its origin--its characteristic properties--outline of manufacture--uses and applications--still experimental.

Tires.

Pneumatic tyre increases efficiency of farm machinery: rice headers and other hauled implements. By J. A. Williamson. Agricultural gazette of New South Wales. v.51, Part 1. January 1, 1940. p.5-9. Tests made at the Rice Research station show that when headers are equipped with these tyres, the horse teams may be reduced from 35 to 50 per cent, even though 8 feet comb is used instead of 6 feet one, and that reasonable speed may be maintained under all conditions, even those which would completely prevent use of steel wheeled headers. Observations made in regard to advantages of pneumatic tyres on number of other hauled farm implements are also given; and it is pointed out that these benefits do not apply to haulage machines, such as tractors, under wet soil conditions.

Tobacco.

Tobacco production benefits by research. By Louis H. Wilson. Better crops with plant food. v.24,no.4. April, 1940. p.12-13,39-40. Discussion of work carried on at Oxford Tobacco Experiment station, Oxford, N.C.

Tractors.

Farmall model A tractor with adjustable wheel track. Automotive industries. v.82,no.3. February 1, 1940. p.119-120.

Garden tractors gain in popularity. Implement and tractor. v.55,no.6. March 16, 1940. p.16-17,36.

Gas-Diesel tractor plants a forty-foot strip. Popular mechanics magazine. v.73,no.5. May, 1940. p.727. Diesel engines delivering thirty to seventy horsepower at drawbar power line of farm tractors just introduced, but each model starts on gasoline and then shifts to full Diesel operation after minute. Suited to farms of various sizes, these tractors have five or six forward speeds and one or two reverse. 53.5 drawbar-horsepower model can pull four drills planting forty-foot strip, drag three double-disk harrows tilling seven acres an hour, and can haul twenty-foot combine over rough land, besides attending to various other heavy farm jobs.

How to select a tractor. Market growers journal. v.66,no.4. February 15, 1940. p.98. 1. Select machine best suited to principal operation. 2. Determine various row widths to which tractor and cultivator may be adjusted, and amount of vertical clearance beneath tractor (18 to 20 inches being desirable). See that action of cultivator control is quick and positive, so close cultivation and accuracy can be obtained. 3. Purchase only after seeing demonstration, preferably on your own place. 4. Operate machine yourself before purchasing. 5. Examine hitch, tool carriage and means of mounting or attaching implements. 6. Deter-

Tractors. (Cont'd).

mine whether repair parts and service can be obtained with reasonable promptness and convenience. 7. Get first hand information as to records of performance from as many sources as possible.

Master tractor shield for power take-off shafts. Farm implement news. v.60,no.25. December 14, 1939. p.23-24,26.

Producer-gas tractor. By Roger North. Implement and machinery review. v.65,no.775. November 1, 1939. p.682-686.

Tractor operating costs. Missouri farmer. v.32,no.6. March 15, 1940. p.7. Average cost an hour for operating tractors was 55 cents for two-plow tractors, 66 cents for three-plow tractors, 77 cents for crawler-type tractors and 97 cents for four-plow tractors, on the basis of 1938 records of the Illinois College of Agriculture.

Tractor repair and maintenance. By R. I. Shawl. Farm implement news. v.61,no.3. February 8, 1940. p.21-22,24,34. Discussion of general principles for non-experts with information applicable to tractors with which a dealer is unfamiliar and for which he has no service manual.

Tractor repair and maintenance. By R. I. Shawl. Farm implement news. v.61,no.7. April 4, 1940. p.22,24,26.

Tuning tractors for performance. By C. E. Packer. Implement and tractor. v.55,no.10. May 11, 1940. p.20-22.

Twenty years of tractor tests at Nebraska State university has given much practical information to both buyers and designers. By P. M. Heldt. Automotive industries. v.82,no.9. May 1, 1940. p.414-415,445-446.

Trucks.

Use of farm trucks in marketing farm products in central Indiana. By T. K. Cowden. Lafayette, Ind., 1939. 37p. Purdue university. Agricultural experiment station. Bulletin no.443.

Turbines.

Trend in hydraulic turbine practice; a symposium: discussion. By Martin A. Mason and E. Shaw Cole. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.735-738.

Trend in hydraulic turbine practice; a symposium: discussion. By Paul L. Heslop and J. D. Scoville. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.1015-1019.

Walls.

Simple sheet-steel framing makes strong, light wall. Popular mechanics magazine. v.73,no.5. May, 1940. p.654.
These members consist of flanged frame into which edge of sheet steel is inserted, and "tensioner" which locks panel sheet in flanged frame. Socket lock screw draws assembly together and holds it in place.

Waste Products.

Wood-pulp waste is converted into alcohol, oils and resin. Popular mechanics magazine. v.73,no.5. May, 1940. p.684-685.
Experimenters discovered that by subjecting wood chips or sawdust in water to alkali and hydrogen with nickel catalyst under high pressures, they could obtain methyl and propyl alcohols, amber resin that may be used for plastics and lacquers, and various oils, and still recover pulp cellulose for making paper.

Water Conservation.

Conserving our rainfall. Prepared by the Water resources committee of the Minnesota resources commission. St. Paul, Minn., 1940. 23p.

Water Rights.

Analysis of legal concepts of subflow and percolating waters: discussion. By Samuel C. Wiel, Hyde Forbes and Ronald B. Harris. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.779-792.

Analysis of legal concepts of subflow and percolating waters: discussion. By Edward F. Treadwell, O. E. Meinzer, M. R. Lewis, and Bayard F. Snow. American society of civil engineers. Proceedings. v.66,no.5. May, 1940. p.1020-1030.

Water Supply.

Source of water derived from wells. By Charles V. Theis. Civil engineering. v.10,no.5. May, 1940. p.277-280.
Continued increase in use of ground water for industrial purposes, and for irrigation, makes more pressing question as to extent of reserves of ground water and advisability and methods of regulating its use. Proper regulation, of course, is conditioned upon ability to forecast with some degree of accuracy future history of water levels in wells in given area. Gives clear picture of factors that must be taken into account in such forecasts, and concludes with brief summary of recommendations for "ideal development of any aquifer from standpoint of maximum utilization of supply.

Unit hydrograph principle applied to small water-sheds: discussion. By Waldo E. Smith. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.690-694.

Water Supply. (Cont'd).

Water supply on Upper Salt River, Arizona: discussion. By LeRoy K. Sherman. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.777-778.

Weeds.

Control of weeds in lawns. By W. C. Muenscher and O. L. Justice. Ithaca, N.Y., 1940. 8p. New York State college of agriculture. Cornell extension bulletin 431.

Controlling weeds with chlorates. By W. C. Muenscher. Ithaca, N.Y., 1940. 4p. New York State college of agriculture. Cornell extension bulletin 432.

How to fight soil-robbing weeds. By George F. Jordan. Missouri farmer. v.32,no.8. April 15, 1940. p.3,5.

Idaho weed program. By H. L. Spence, Jr. Reclamation era. v.30,no.3. March, 1940. p.80-81.

Tillage equipment for weed control. By A. J. Schwantes. Implement and tractor. v.55,no.6. March 16, 1940. p.18. Deals only with tillage methods and practices.

Weeds under electric fence cut with mowing machine. Popular mechanics magazine. v.73,no.5. May, 1940. p.787. Wisconsin farmer drives stakes or posts that support wire into ground at angle. Then weeds can be cut with mowing machine instead of scythe. In following this method, be sure that posts lean sufficiently for mower sickle to slide along on ground under wire without striking them. If fence has been built near ground for swine and other small animals, it may be necessary to remove swath board from end of sickle bar. If this is done, sickle can slip under very low stakes.

Weirs.

Pressure-momentum theory applied to the broad-crested weir: discussion. By I. M. Nelidov. American society of civil engineers. Proceedings. v.66,no.4,Part 1. April, 1940. p.804-808.